Full text

bar magnet

n

[[1]*bar*]

: a magnet in the shape of a bar with poles at its ends

Full text

permanent magnet

n

: a magnet that retains its magnetism after removal of the magnetizing force — see MAGNETO illustration

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- **bar magnet** [ELECTROMAGNETISM] A bar of hard steel that has been strongly magnetized and holds its magnetism, thereby serving as a permanent magnet.
{ 'bär ˌmag•nət }

  Score: 0.82

- **Atomic structure and spectra**
Spin-orbit coupling This is the name given to the energy of interaction of the electron's spin with its orbital angular momentum. The origin of this energy is magnetic. A charge in motion through either "pure" electric or "pure" magnetic fields, that is, through fields perceived as "pure" in a static laboratory, actually experiences a combination of electric and magnetic fields, if viewed in the frame of reference of a moving observer with respect to whom the charge is momentarily at rest. For example, moving charges are well known to be deflected by magnetic fields. But in the rest frame of such a charge, there is no motion, and any acceleration of a charge must be due to the presence of a pure electric field from the point of view of an observer analyzing the motion in that reference frame. See also: Relativistic electrodynamics A spinning electron can crudely be pictured as a spinning ball of charge, imitating a circulating electric current (though Dirac electron theory ...
Related Topic: Physics
Score: 0.69

- **magnetic needle** [ELECTROMAGNETISM] 1. A bar magnet or collection of bar magnets which is hung so as to show the direction of the magnetic field. 2. In particular, a slender bar magnet, pointed at both ends, that is pivoted or freely suspended in a magnetic compass.
{ mag'ned•ik 'nēd•əl }

  Score: 0.69

Arago's disk [ELECTROMAGNETISM] A device consisting of a horizontal disk of copper that can rotate about a vertical axis in an airtight box, and a horizontal bar magnet suspended above the disk but outside the box; upon rapid rotation of the disk, the bar magnet is deflected and eventually rotates in the same direction with smaller velocity.
{ 'a•rə,gōz ,disk }

Score: 0.68

Electric organ (biology)
An effector organ found in six different groups of fishes; output is an electric pulse (Table 1 ; Fig. 1). Voltages large enough to aid in prey capture or predator deterrence are produced by various strongly electric fishes. These include the electric eel (Electrophorus electricus) from South America; the electric catfish (Malapterurus electricus) from Africa; the family of electric rays, Torpedinidae, which are widely distributed in the world's oceans; and possibly the stargazer genus, Astroscopus, of the western Atlantic. Weakly electric fishes emit a lower voltage, the energy source for an active electrosensory system that monitors electrical impedance in the environment. These weak signals also serve in intra- and interspecific communication. There are three groups of weakly electric fishes. First, the South American knifefishes, the Gymnotiformes, are a large and diverse group of several families that also include Electrophorus. Second, the electrically active African Mormyriformes are composed of the numerous species of the family Mormyridae and the single species Gymnarchus niloticus in the family Gymnarchidae. Finally, many species of skates and rays of the family Rajidae occur in marine waters worldwide. Table 1. Groups of electric fishes* Common name Family Genera and species Strength of organ discharge Distribution Skates, ordinary rays Rajidae Raja, many species, a number of other genera not known to be electric Weak Marine, cosmopolitan Electric rays, torpedos Torpedinidae About 20 genera Strong, up to 60 V or 1 kW, some perhaps weak Marine, cosmopolitan Mormyrids, elephant-nosed fish (many lack enlarged chin or snout) Mormyridae About 11 genera, several with many species Weak Fresh-water, Africa Gymnarchus Gymnarchidae 1 species, Gymnarchus niloticus Weak Fresh-water, Africa Gymnotid eels, electric eel, knifefishes Electrophoridae 1 species, Electrophorus electricus Strong, more than 500 V Fresh-water, South America Gymnotidae 1 specie
Related Topic: Biological & Biomedical Science
Score: 0.66

Elementary particle
String model of confinement A specific form for the gluonic force between two colored particles, at large r, namely that it falls to a nonzero constant value , of the order of crc-2, is suggested by a model, the superconductor analogy. This force is confining. (Evidence for this form of the gluonic force also comes from a nonperturbative method of calculating QCD, lattice QCD.) A superconductor excludes a magnetic field from its interior, below a penetration depth D, except in the form of flux bundles, which have a diameter of order D, and one unit of flux, namely 0 = 2/Qsc, where Qsc is the charge of the carriers of the supercurrent. (For a real superconductor, the carriers are Cooper pairs of electrons, so Qsc = 2e.) Superconductivity is destroyed along the core of the bundle. If a magnetic monopole were available and put into a superconductor, the magnetic flux leaving the monopole would gather into a flux bundle (in a real superconductor, two bundles) ...
Related Topic: Physics
Score: 0.66

Exchange interaction
Aconsequence of the quantum mechanics of interacting identical particles that is responsible for magnetic interactions between electrons and atoms in solids, and magnetic order such as ferromagnetism and antiferromagnetism. The exchange interaction is actually not one of the fundamental interactions such as electromagnetism, but an effect that arises from the interplay of electromagnetism with quantum mechanics. See also: Electromagnetism
Related Topic: Physics
Score: 0.66

- **Magnetic compass**
  Acompass depending for its directive force upon the attraction of the Earth's magnetism for a magnet free to turn in any horizontal direction. A compass is an instrument used for determining horizontal direction.
  Related Topic: ▸▸ Navigation
  Score: 0.66

- **Magnetic reversals**
  The Earth's magnetic field has reversed polarity hundreds of times. That is, at different times in Earth's past, a compass would have pointed south instead of north. Recognition that the geomagnetic field has repeatedly reversed polarity played a key role in the revolution that transformed the geological sciences in the 1960sthe acceptance of the theory of plate tectonics. It is generally accepted that the geomagnetic field is generated by motion of electrically conducting molten metal in Earth's outer core. However, the mechanism by which the field decays and reverses polarity remains one of the great unknowns in geophysics. See also: Geomagnetism; Plate tectonics
  Related Topic: ▸▸ Earth Science
  Score: 0.66

- **Magnetic reversals**
  ILLUSTRATIONS Fig. 1: Time scale of reversals of Earth's magnetic field for the last 5 million years (Cande and Kent, 1995). Color intervals represent periods when Earth's magnetic field was in the same state as the present field (called the normal polarity state) when a compass would point north. White intervals represent periods when Earth's magnetic field was in the opposite state as the present field (called the reversed polarity state) when a compass would point south. The boundaries between these polarity intervals represent short periods of geological time. Long intervals of nearly constant polarity are termed chrons, while shorter periods of opposite polarity within a chron are termed subchrons. The last four chrons are named after famous contributors to geomagnetism (Brunhes, Matuyama, Gauss, and Gilbert), while the subchrons in these intervals are named after the locations at which they were first discovered ...
  Related Topic: ▸▸ Earth Science
  Score: 0.66

- **Magnetism**
  The branch of science that describes the effects of the interactions between charges due to their motion and spin. These may appear in various forms, including electric currents and permanent magnets. The interactions are described in terms of the magnetic field, although the field hypothesis cannot be tested independently of the electrokinetic effects by which it is defined. The magnetic field complements the concept of the electrostatic field used to describe the potential energy between charges due to their relative positions. Special relativity theory relates the two, showing that magnetism is a relativistic modification of the electrostatic forces. The two together form the electromagnetic interactions which are propagated as electromagnetic waves, including light. They control the structure of materials at distances between the long-range gravitational actions and the short-range "strong" and "weak" forces most evident within the atomic nucleus. See also: Electromagnetic radiation; Relativity
  Related Topic: ▸▸ Physics
  Score: 0.66

- **Magnetism**
  ILLUSTRATIONS Fig. 1: Magnetic lines of a bar magnet. 2: Magnetic circuit with an air gap. 3: Coils coupled by a ring of ferromagnetic material of uniform cross section. 4: Circuit analogy. Components of a magnetic circuit carrying a flux analogous to current. The reluctances "${\Re}$"> of the components are analogous to resistance, "${\Re}$"> ...
  Related Topic: ▸▸ Physics
  Score: 0.66

- **Neptune**
  The atmosphere Most of what is known about Neptune is the result of the flyby of the planet by the Voyager 2 spacecraft in August 1989. The cloud features that were dimly glimpsed from Earth were recorded in great detail (Fig. 1). They included a large dark oval (about the size of Earth), reminiscent of Jupiter's Great Red Spot, as well as the white clouds of condensed methane whose brilliant contrast with the blue-green atmosphere made them visible from Earth. Unlike the Great Red Spot, Neptune's dark oval proved to have a short lifetime, as subsequent observations from Earth showed that it had disappeared. By following the clouds over several weeks, scientists were able to deduce the presence of currents at different latitudes, with a tendency for the high-latitude winds to be faster than those near the equator ...
  Related Topic: Astronomy & Space Science
  Score: 0.66

- **Solar corona**
  The outer atmosphere of the Sun. The corona is dominated by intense magnetic forces, which penetrate it from denser regions of the Sun. Coronal gas accumulates around these magnetized regions to produce the shapes seen during a solar eclipse, with a coronagraph, or in x-rays (see illus.). These shapes include long streamers that penetrate interplanetary space, looplike tubes over the strongest fields, and vast regions of very low density called coronal holes. The general magnetic field of the Sun, about 1 gauss (0.1 millitesla), is revealed near the north and south poles by polar rays that resemble the pattern formed by iron filings near a bar magnet. The corona is hot enough to emit x-rays, and x-ray telescopes in space can form images of the corona. Such images display the magnetic loops connecting bright regions in the lower corona (dark in the inner portion of the illustration , which is an x-ray negative).Fig. Outer part of the figure is a contrast-enhanced photograph of the total solar eclipse of June 30, 1973; coronal structures such as streamers are visible. Inner portion of the figure is a negative x-ray image of the lower corona made from a rocket at the same time and oriented so that the features in the lower corona correspond to the outer features seen at eclipse. (After R. C. Altrock, ed., Solar and Stellar Coronal Structure and Dynamics, Proceedings of the 9th Sacramento Peak Summer Symposium, National Solar Observatory, Sunspot, New Mexico, Association of Universities for Research in Astronomy, 1988)
  Related Topic: Astronomy & Space Science
  Score: 0.66

- **Sun**
  Flares The most spectacular activity associated with sunspots is the solar flare (Fig. 15). A flare is defined as an abrupt increase in the H emission from the sunspot region. The brightness of the flare may be up to eight times that of the chromosphere; the rise time is seldom longer than a few minutes. The H brightening results from heating of the chromosphere at the foot points of the magnetic field by a tremendous energy release in the atmosphere. While flares are usually visible only in chromospheric lines, the foot points of big flares can be seen in white light ...
  Related Topic: Astronomy & Space Science
  Score: 0.66

- **Uranus**
  The first planet to be discovered with the telescope and the seventh in the order of distance from the Sun. It was found accidentally by W. Herschel in England on March 13, 1781. Herschel's home-made telescope was good enough to show that this object was not starlike; Uranus appeared as a fuzzy patch of light, not a point. At first he thought that it was a comet, but subsequent calculations of the orbit demonstrated that Uranus was actually a planet, about twice as far from the Sun as Saturn and therefore in an orbit that agreed almost exactly with the prediction of the Titius-Bode relation for planetary distances. See also: Planet
  Related Topic: Astronomy & Space Science
  Score: 0.66

- **Atom interferometer, magnetic waveguide**
  ILLUSTRATIONS Fig. 1: Atomic beam interferometer with two separated paths, three gratings, and one detector for the output of each port. The interferometer is sensitive to rotations in the plane of the beams, and its sensitivity goes as the area A. The probability of either of the two detectors to see the atom is determined by the trajectories of the atoms (and anything perturbing those trajectories) in each arm of the interferometer. (Courtesy of T. Kishimoto) 2: Magnetic field strength above two current-carrying wires with a uniform external field Bext applied. (a) Configuration with separated wires. Atoms are trapped in the waveguide at the field minimum above each wire and propagate through the field minimum along the length of the wires ...
  Related Topic: Physics Engineering & Materials
  Score: 0.66

- **Jupiter**
  Ganymede results As with the Io flyby, the close encounters with Ganymede provided key information on its internal structure and its interactions with Jupiter's magnetic environment. Magnetic field Data from the Plasma Wave Spectrometer (which measures electromagnetic and electrostatic waves over a wide frequency range) during the first Ganymede flyby revealed that a large region around the satellite was filled with naturally occurring radio noise of the type generated around planets (such as the Earth) which have magnetic fields and radiation belts. This result had certainly not been expected for an icy satellite orbiting Jupiter. Magnetic field data rapidly confirmed an increase (by a factor of 5) in field strength near the satellite, suggesting strongly that Ganymede possesses its own magnetic field which, in effect, creates a little magnetosphere, immersed within the immense Jovian magnetosphere. Data from the second flyby confirmed these results and allowed ...
  Related Topic: Astronomy & Space Science
  Score: 0.66

- **Starburst galaxy**
  Anormal galaxy like the Milky Way produces a few new stars each year. Starburst galaxies create new stars much more frequently, especially in the central regions, at rates tens or even hundreds of times higher. This phenomenon is still a mystery; a large supply of dense gas collected around the nucleus of the galaxy can supply the raw material for star formation, but it is not clear why or how the gas piles up in this way. Some likely causes include the formation of a galactic bar, with stars and gas following elliptical orbits that pass near the nucleus, or an interaction with another passing galaxy that perturbs the orbital motions. A third influence may be a magnetic field; since interstellar gas is partially ionized and ionic particles tend to move with magnetic field lines, this can ease the flow of gas toward the nucleus. In the last few years, astronomical techniques have been developed that allow the magnetic field to be imaged in starburst galaxies.
  Related Topic: Astronomy & Space Science
  Score: 0.66

- **Ultracold neutrons**
  Measuring the lifetime Previous measurements of the neutron lifetime can be categorized into one of two types of measurements, beam or bottle. In a beam measurement, a cold neutron beam passes continuously through a decay region of known volume, and each neutron decay occurring within that volume is counted. The neutron lifetime is given by the ratio of the number of decays per second to the number of neutrons in the decay region. In the most precise measurement to date using this method (n = 889.2 s 4.8 s2), the major uncertainty, or "margin of error," is attributable to systematic effects in the measurement of the neutron flux (number of neutrons which pass through the volume). In a bottle-type measurement, neutrons are loaded into a containment vessel and stored for a variable length of time before being counted. The neutron lifetime can be extracted from the dependence of the detected neutron population on the storage time. Several storage techniques have been used to make ...
  Related Topic: Physics
  Score: 0.66

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